



US009177530B2

(12) **United States Patent**
Olsen, Jr.

(10) **Patent No.:** **US 9,177,530 B2**
(45) **Date of Patent:** **Nov. 3, 2015**

(54) **HANDHELD DOCUMENT READING DEVICE WITH AUXILIARY DISPLAY**

(56) **References Cited**

U.S. PATENT DOCUMENTS

(71) Applicant: **Brigham Young University**, Provo, UT (US)

5,467,102 A 11/1995 Kuno et al.

5,844,569 A 12/1998 Eisler et al.

(72) Inventor: **Dan R. Olsen, Jr.**, Orem, UT (US)

6,124,851 A 9/2000 Jacobson

6,628,244 B1 9/2003 Hirose et al.

(73) Assignee: **Brigham Young University**, Provo, UT (US)

7,176,848 B1 2/2007 Dai et al.

7,242,369 B2 7/2007 Huang

7,564,425 B2 7/2009 Martinez et al.

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 43 days.

8,462,124 B2 6/2013 Cain et al.

8,502,833 B2 8/2013 Tsai et al.

8,613,061 B2 12/2013 Dvorak et al.

2012/0218191 A1 8/2012 Huang et al.

2012/0240040 A1* 9/2012 Hase et al. 715/273

2013/0086505 A1 4/2013 de Paz et al.

(21) Appl. No.: **14/216,693**

FOREIGN PATENT DOCUMENTS

(22) Filed: **Mar. 17, 2014**

CN 102646008 8/2012

(65) **Prior Publication Data**

* cited by examiner

US 2014/0267026 A1 Sep. 18, 2014

Related U.S. Application Data

(60) Provisional application No. 61/789,059, filed on Mar. 15, 2013.

(51) **Int. Cl.**

G09G 5/00 (2006.01)

G09G 5/12 (2006.01)

G06F 3/0484 (2013.01)

G06F 3/14 (2006.01)

(52) **U.S. Cl.**

CPC **G09G 5/12** (2013.01); **G06F 3/0484** (2013.01); **G06F 3/1454** (2013.01)

(58) **Field of Classification Search**

None

See application file for complete search history.

(57)

ABSTRACT

A method to display an electronic document includes receiving an electronic document, displaying a current page of the electronic document on a screen of a handheld device operated by a user, and displaying one or more adjacent pages of the electronic document on an external display. The method may also include changing the current page on the screen of the handheld device and the adjacent pages on the external display in response to user input. In some embodiments, the method includes pinning or unpinning one or more selected page(s) on the external display in response to user input. A corresponding apparatus, system, and computer readable medium are also disclosed herein.

22 Claims, 7 Drawing Sheets

